Intensive floristic explorations for aquatic angiosperm taxa in Andhra Pradesh yielded one rare and interesting taxon. Based on critical taxonomic studies and comparisons with authenticated specimens at MH and CAL, this was identified as *Rikliella kernii* (Raymond) Raynal. This was hitherto not reported from Andhra Pradesh. Brief description along with nomenclatural citation, ecological and phenological data is provided to facilitate easy identification.

Rikliella kernii (Raymond) J. Raynal, Adansonia Ser. 2,13:155.1973.

Scirpus kernii Raymond, Naturaliste Canad. 86:230.1959; Raynal, Adansonia ser.2,8:95, t.1, f.1-5.1968; Saldanha and Nicolson in Fl. Hassan District, 695-696.1976. (Fig. 1)

Small tufted annual with brownish fibrous roots. Culms few to several, slender, up to 6 cm tall. Leaves only at base, 1-3 to a culm, filiform, subacute at apex, sheaths papery red-purple. Spikes oblong-ovoid, bearing many glumes imbricated on a straight rhachis; spikelets reduced to a single glume subtending a bisexual flower; glumes obdeltoid-obovate, cuneate; with an arista of equal length; stamens one; style very short. Achenes obovate.

Ecology: Moist places at low elevations, rare.

Flowering: August - December.

Distribution: WORLD: Tropical Africa. INDIA: Karnataka, Madhya Pradesh, Andhra Pradesh.

Specimens examined: Nirmal (Adilabad District), MHR & KI - 14577.

Note: *Rikliella kernii* (Raymond) Raynal is mostly akin to *Rikliella squarrosa* (L.) Raynal but it can be distinguished from the latter by its narrow leaves, bi-fid stigma and distantly spreading bracts.

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39. SOME LITTLE KNOWN AND RARE HIGH ALTITUDE SPECIES OF *POA* FROM GARHWAL HIMALAYA

Garhwal Himalaya represents one of the most interesting floristic zones, not only in the Himalayan belt but of the Indian subcontinent because of rich vegetational diversity, sustained in varied topographic, climatic and edaphic extents. The Poaceae is represented by maximum number of species (Duthie 1906), and the type genus *Poa* is the most interesting one, on account of its distribution in the temperate and alpine zones of the Himalayas as well as its ambiguity in taxonomic details, as it requires critical microscopic observations of glumes, lemmas, paleas, anthers and other phenotypic features (Rajbhandari 1991). In recent efforts on the floristic explorations to Garhwal Himalaya, we collected some interesting species of *Poa* from high altitude zones of Garhwal Himalaya. Perusal of literature (Hooker 1896, Duthie 1906, Bor 1960, Semwal and Gaur 1983, 1986; Naithani 1985; Rajbhandari 1991; Uniyal *et al.* 1994), indicated that these species are new and or rare records from this part of the Himalaya, representing extension of their eastward or westward distribution.

A key of these little known species of *Poa* together with brief description along with their habitat, occurrence, approximate elevation and collector's herbarium number is given. Plant specimens were matched with the authentic specimens of Botanical Survey, Northern Circle, (BSD) and Forest Research Institute, (DD), Dehradun and deposited at the Herbarium H.N.B. Garhwal University, Srinagar-Garhwal (GUH).

KEY TO THE SPECIES OF *Poa*

1.1 Basal sheaths with a bulbous thickening at the base:
2.1 Lemma keel scabrid; spikelets non-proliferous ..... 2. *P. bacteriana*
2.2 Lemma keel ciliate on the lower part; spikelets proliferous. ..... 3. *P. bulbosa*

1.2 Basal sheaths without bulbous thickening at the base:
3.1 Tufted non-rhizomatous plants:
4.1 Panicle spreading; palea keels scabrid:
5.1 Lemma quite glabrous, broadly hyaline on the margins only. ..... *P. aitchisonii*
5.2 Lemma at least ciliate on the keels and nerves, hyaline on the margins as well as at the tips:
6.1 Lower glumes smaller, reaching half-way up on the lowest lemma, or less; lemmas 3.4-4.5 mm long. ..... 4. *P. himalayana*
6.2 Lower glumes longer than half the lowest lemma; lemmas 3-4 mm long:
7.1 Lemmatal nerves conspicuous; lower glumes very narrow, 1-nerved; lowest branches of the panicle 3-5 nate. ..... 5. *P. khasiana*
7.2 Lemmatal nerves inconspicuous; lower glumes lanceolate or elliptic, 3-nerved; lower branches of the panicle 2-nate. ..... 10. *P. sterlis*
4.2 Panicle branches ascending densely contracted; palea keels semipilose. 6. *P. koelzii*
3.2 Rhizomatous plants:
8.1 Plants conspicuously curved at the base; ligules short, about 1 mm long. ..... 7. *P. pratensis* ssp. *alpigena*
8.2 Plants erect from the base; ligules 1.5-2.3 mm long:
9.1 Basal leaves narrow, almost setaceous; ligules 1.5-2 mm long. ..... 8. *P. pratensis* ssp. *anguistifolia*
9.2 Basal leaves broad and flat; ligules 2-2.3 mm long. ..... 9. *P. pratensis* ssp. *pratensis*

Poa aitchisonii Boiss. Fl. Orient. 5: 602. 1884; Bor in J. Bombay nat. Hist. Soc. 50: 835. 1953; GBCIP 554. 1960.

Tufted, 14-27 cm tall herbs; leaves flat; sheaths glabrous; ligules 0.8-1 mm long; panicle spreading; spikelets 3-5 flowered; anthers. 1.9-2 mm long.

Fl. & Fr.: October-November.

Specimen examined: Dali (Chamoli), 3900 m, D.C. Nautiyal, GUH: 14,001.

The species occurs in sporadic patches along the open alpine meadows, usually associated with species of *Kobresia* and *Carex*. Earlier, the species was recorded from the far North West Himalaya, Kurram Valley and Afghanistan (*see* Bor 1960).

P. bacteriana Roshev. in Bot. Mater. Gerb. Glavn. Bot. Sada 4: 93. 1923; Bor, GBCIP. 556. 1960; Cope in Nasir & Ali, Fl. Pak. 143: 403. 1982.

Tufted, 2-3 noded herbs; 20-48 cm tall; leaves flat or folded; sheaths glabrous, bulbous at the base; ligules 1.5-3 mm long; panicle branches ascending; anthers 1.5-1.7 mm long.

Fl. & Fr.: June-July.

Specimen examined: Tapovan (Uttarkashi), 5000 m, D.C. Nautiyal, GUH: 14,003.

Rare, along the alpine slopes, usually associated with species of *Pedicularis, Astragallus* and *Leontopodium*, etc. Earlier this species was reported from Lahul (H.P.) by Bor (1960) and Aswal and Mehrotra (1994).

P. bulbosa L., Sp. Pl. ed. 1: 70. 1753; Hook.f., Fl. Brit. Ind. 7: 338. 1896; Bor, GBCIP. 556. 1960; Uniyal *et al.*, Grasses. U.P. 72. 1994.

Tufted herbs; 18-42 cm tall, nodes 2; leaves flat or folded; sheaths glabrous, bulbous at base; ligules 1.2-3 mm long; spikelets mostly proliferous; anthers 1-1.3 mm long.

Fl. & Fr.: June-July.

Specimen examined: Gaumukh (Uttarkashi), 4500 m, D.C. Nautiyal, GUH: 14,004.

This species was collected from a high altitude zone along the Gaumukh glacier. Rare, associated with *Trisetum spicatum, Saxifraga* and *Androsace* populations. This species was reported from Lahul valley (Bor, 1960, Aswal and Mehrotra 1994).

P. himalayana Nees ex Steud., syn. Pl. Glum. 1: 256. 1854; Hook.f., Fl. Brit. Ind. 7: 344. 1896; Bor, GBCIP. 557. 1960; Uniyal *et al.*, Grasses. U.P. 72. 1994.

Tufted, sometimes stoloniferous, terete, 3-5 noded herbs; leaf blades flat; sheaths glabrous;

ligules 0.8-1.6 mm long; panicle branches spreading; spikelets 2-3 flowered; anthers 0.7-1 mm long.

Fl. & Fr.: June-July.

Specimen examined: Chirbasa (Uttarkashi), Yamnotri (Tehri Garhwal), 3500 m, D.C. Nautiyal, GUH: 14,006, 14,915.

Rare, in scattered population, only a few specimens collected under moist boulders. This was recorded from Sikkim (Hooker 1896, Bor 1960).

P. khasiana Stapf in Hook.f., Fl. Brit. Ind. 7: 343. 1896; Bor in J. Bombay nat. Hist. Soc. 50: 830. 1952; GBCIP. 557. 1960.

Loosely tufted herbs; 20-56 cm, terete, smooth; leaves flat; sheaths glabrous; ligules 0.8-2 mm long; panicle spreading, lower branches 3-5; spikelets 2-3-flowered; anthers 0.7-1 mm long.

Fl. & Fr.: June-July.

Specimen examined: Bhojbasa (Uttarkashi), 3900 m, D.C. Nautiyal, GUH: 14,008.

Rare, occurs under rock crevices and in between boulders, in shady localities. This species has been reported from eastern Himalaya particularly from Khasia and Shillong hills (Hooker, 1896, Bor 1960).

P. koelzii Bor in Kew Bull. 1948; 139. 1948; GBCIP. 557. 1960; Uniyal *et al.*, Grasses. U.P. 75. 1994.

Densely tufted herbs; culms not above 15 cm tall, glaucous or not, nodes 1-2; leaf blades folded, glaucous, glabrous; sheaths glabrous; ligules 1.2-2 mm long; panicle 6 cm long; branches ascending; palea keels semipilose; anthers 1.2-1-5 mm long.

Fl. & Fr.: October-November

Specimen examined: Gaumukh (Uttarkashi), 4000 m, D.C. Nautiyal, GUH: 14,009.

Rare. Under rock crevices and boulders, associated with *Deuxia pulchella, Elymus nutans* and *Kobresia* sp. Earlier this species was reported from Kashmir (Bor 1960) and Lahul, H.P. (Aswal and Mehrotra 1994).

P. pratensis subsp. **alpigena** (Blytt.) Hitt., Suomkasvio: 205. 1933. *P. alpigena* Lindm., Svensk Fanerogam. Fl. 91. 1918; Bor, GBCIP. 555. 1960; Uniyal *et al.*, Grasses. U.P. 72. 1994.

Rhizomatous herbs, with curved underground stem; culms 6-22 cm, node 2-3; leaves flat; sheaths glabrous; ligules 1.1-1.5 mm long; panicle branches spreading or ascending; anthers 1.5-1.6 mm long.

Fl. & Fr.: June-July.

Specimen examined: Tapovan (Uttarkashi), 5000 m, D.C. Nautiyal, GUH: 14,011.

Rare, on alpine meadows, on sandy soil and associated with *Elymus nutans, Polygonum* and *Kobresia.* Earlier reported from Yatung and Gyanste in Tibet (*see* Bor 1960).

P. pratensis subsp. **anguistifolia** (L.) Gaud., Agrost. Helv. 1: 214. 1811; Uniyal *et al.,* Grasses. U.P. 75. 1994, *P. anguistifolia* L., Sp. Pl. ed. 1: 67. 1753; Bor, GBCIP. 555. 1960. *P. pratensis* L. sub sp. *pratensis* auct. non L.: Ohwi in Hara. Fl. E. Himal. 2: 145. 1971. *P. pratensis* L. var. *anguistifolia* (L.) J.E.Sm., Fl. Brit. 105. 1800; Hook.f., Fl. Brit. Ind. 7: 340. 1896.

Rhizomatous, erect herbs; 22-60 cm tall; leaf blades folded, almost setaceous; sheaths glabrous; ligules 1.5-2 mm long; panicle spreading; spikelets 3-4 flowered; anthers 1.2-2 mm long.

Fl. & Fr.: June-July.

Specimen examined Bhojbasa (Uttarkashi), 3900 m, D.C. Nautiyal, GUH: 14,012.

Rare, under rock crevices and shelter of boulders along the timber line zone, often associated with species of *Astragalus, Festuca* and *Geranium,* etc. This species was collected earlier from Kashmir and Tehri Garhwal by Duthie (*see* Bor 1960).

P. pratensis L., Sp. Pl. ed. 1: 67. 1753. sub sp. *pratensis* Stapf in Hook.f., Fl. Brit. Ind. 7: 339. 1896; Bor, GBCIP. 559. 1960; Uniyal *et al.,* Grasses. U.P. 75. 1994.

Rhizomatous, erect herbs; culms 6-75 cm, terete, nodes 2-3; leaves linear; sheaths glabrous; panicle spreading or ascending; anthers 1.5-2 mm long.

Fl. & Fr.: June-July.

Specimen examined: Tapovan (Uttarkashi) 5000 m, D.C. Nautiyal, GUH: 14,013.

Rare. Open alpine meadows, usually associated with species of *Primula, Ranunculus* and *Elymus,* etc. Earlier this species was reported from Kashmir and Himachal Pradesh.

P. sterlis M. Bieb., Fl. Jour. Cans. 1: 62. 1808; Bor, GBCIP. 560. 1960; Uniyal *et al.* Grasses. U.P. 75. 1994.

Tufted, scabrid herbs; culms 30-40 cm tall, nodes 2-3; leaf blades flat or sometimes convolute; sheaths glabrous or scabrid; ligules 2.5-3 m long; panicle spreading; anthers 1.7-2.2 mm long.

Fl. & Fr.: June-July.

Specimen examined:- Gangotri (Uttarkashi), 3140 m, D.C. Nautiyal, GUH: 14,014.

Rare. In moist and shady banks of streams; associated with *Festuca, Poa annua* and *Carex* sp. Species known exclusively from Ladakh and Kashmir (Bor, 1960) and from Lahul (Aswal and Mehrotra, 1994).

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40. SOME NEW PLANT RECORDS FOR INDIA

During the course of studies on Flora of Sikkim, some interesting collections were recorded. Further studies of these specimens with the help of types/ protologues and the specimens housed at CAL, K, BSHC, and E. Herbaria and a scrutiny of the literature (Hooker 1892, Karthikeyan, *et al.* 1989) revealed that these are additions to the Flora of India. Brief taxonomic accounts of these taxa are provided here to facilitate their identification in the field.

Juncus amplifolius A. Camus in Not. Syst. 1(10): 281.1910.

Herbs. Roots-stocks stout, woody. Stems up to 35 cm high. Scale-leaves many, reddish. Rosette leaves up to 1.5 x 0.3 cm; cauline leaves up to 3, shorter than stems; sheaths without auricles. Inflorescence terminal, with 2-4 unequally peduncled capitula. Capitula *c.* 1 cm in diameter, 3-4-flowered; lowest bract leafy. Perianth lanceolate, subequal, 4.5 -6 x 1.2 -1.5 mm, dark reddish-brown. Stamens shorter than perianth, anthers 2 -2.4 mm long. Stigma lobes twisted. Capsules ellipsoid, *c.* 5 x 2.4 mm, abruptly contracted into slender exserted beak, chestnut coloured.

Fl. & Fr.: June-July.

Specimen Examined: Monlepcha-Phedang, *ca.* 3800 m, **ESIK** 750(E).

Habitat: In Abies-Rhododendron forests along streams, bogs and road-sides at 3250-4000 m

2. **Juncus bryophilus** Noltie, Edinb. J. Bot. 51(2):137-138.1994.

Herbs. Rhizomes short. Stems loosely tufted, swollen at base, clothed with dark brown, leafy scales at base. Cauline leaf solitary, filiform, almost, bitubular; sheaths auricled. Flower solitary,